

Atty. Docket No. URE02 P-301B  
Express Mail No. EL530114725US

## PLASTIC MATERIAL

### CROSS-REFERENCE TO RELATED APPLICATIONS

- 4-04
- [0001] This application is a division of and claims the benefit of United States Patent Application No. 10/253,252, filed on September 24, 2002, <sup>and now U.S. Patent No. 6,624,244</sup> which is a continuation of U.S. Patent No. 6,465,569, which is based upon and claims the benefit of PCT Application No. WO 00/15684, filed on September 17, 1999, which is a continuation-in-part and claims the benefit of United States Patent Application No. 09/154,340, which has now issued as U.S. Patent No. 6,180,686.

### BACKGROUND OF THE INVENTION

- [0002] Because of their widely ranging mechanical properties and their ability to be relatively easily machined and formed, plastic foams and elastomers have found wide use in a multitude of industrial and consumer applications. In particular, urethane foams and elastomers have been found to be well suited for many applications. Automobiles, for instance, contain a number of components, such as cabin interior parts, that are comprised of urethane foams and elastomers. Such urethane foams are typically categorized as flexible, semi-rigid, or rigid foams with flexible foams generally being softer, less dense, more pliable, and more subject to structural rebound subsequent to loading than rigid foams.
- [0003] The production of urethane foams and elastomers are well known in the art. Urethanes are formed when isocyanate (NCO) groups react with hydroxyl (OH) groups. The most common method of urethane production is via the reaction of a polyol and an isocyanate which forms the backbone urethane group. A cross-linking agent may also be added. Depending on the desired qualities of the final urethane product, the precise formulation may be varied. Variables in the formulation include the type and amounts of each of the reactants.
- [0004] In the case of a urethane foam, a blowing agent is added to cause gas or vapor to be evolved during the reaction. The blowing agent creates the void cells in the final foam, and commonly is a solvent with a relatively low boiling point or water. A low boiling solvent evaporates as heat is produced during the exothermic isocyanate/polyol reaction to form vapor bubbles. If water is used as a blowing agent, a reaction occurs between the water and the